



Renewable Energy Research Conference, RERC 2014

How to maximize the chances of sustainable renovation in housing cooperatives

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Abstract

Obtaining sustainable renovation in large housing cooperatives is often a challenge. Two thirds majority vote at the general meeting is required. A lack of engagement may delay the process, and the residents often remain passive until they realize there is a risk of increased fees if the plans are carried out. Even if the investments are well grounded economically, the residents' fear of economic consequences is often an obstacle during the process. The residents may get involved, but will oppose the renovation. The decision process is then often called off, and needs to start over. As postponing necessary renovations substantially increases the risk of building degradation, it is of importance to map factors that increase the chances of housing cooperatives coming to an agreement on sustainable and energy efficient renovations. Through action research, three pilot studies, looking at decision processes for sustainable upgrading are followed over a period of two years. Preliminary results show that openness in the initial stages of the process is crucial. Also, visualizing the results and consequences may be effective means to obtain a dialogue with the residents, who are often more interested in the aesthetic factors than the technical solutions. Visualization of AMS (Advanced Monitoring Systems) and other household specific measurements can make residents more aware of their energy use, and explain/illustrate the need for upgrading. If communicated (visualized feedback) to the residents in a comprehensive and user friendly way, the introduction of AMS may make people more aware of their energy use, hence facilitate the decision making process regarding sustainable renovation. After renovation, the indoor climate may be more easily influenced by the building use than previously. AMS can help maintain an environmental friendly life style.

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Peer-review under responsibility of the Scientific Committee of RERC 2014

Keywords: Housing cooperatives; decision processes; upgrade/ renovation; energy efficiency; sustainability; AMS

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1. Background

In Europe today, 35-40% of the energy is used in buildings. International studies show that energy efficiency improvement is the cheapest and simplest climate action [1]. A necessary consequence for the building sector is extensive renovation of existing buildings, altering them to structures with little energy use [2].

Necessary and sustainable renovation of buildings is often problematic when the owners are lay people without experience of building/renovation processes, particularly when a building is owned collectively by many residents. Most people in Norway are owner-occupiers. Nearly 80% of the households are freeholders. 14 % of the freeholders own their dwelling unit through a housing cooperative (most housing cooperatives are blocks of flats in the cities) (www.ssb.no). «Borettslag» is the legal entity for housing cooperatives in Norway. This company is owned by those who live in the cooperative; the shareholders. Each share gives the resident the right to live in the cooperative, in a particular apartment (or house), and the shareholder is free to sell her/his part. When a part is for sale, the cooperative statute can give internal first preference (to other shareholders). The highest authority in the cooperative is the annual meeting of shareholders, at which the board responsible for daily operations is elected. Most housing cooperatives are members of a cooperative housing association (cooperative building society) that functions as general manager of the housing cooperative. Most cooperative housing associations in Norway are members of the Norwegian Federation of Cooperative Housing Associations (www.nbbl.no).

Obtaining sustainable renovation in large housing cooperatives is often a challenge. Two thirds majority vote at the general meeting is required. A lack of enthusiasm may delay the process, and the residents will often remain passive until they realize there is a risk of increased rents if the plans are carried out. Even if the investments are well grounded economically, the residents' fear of economic consequences is an obstacle in the process. The residents may get involved, but will oppose the renovation. The decision process is then often called off, and will need to be started over. As postponing necessary renovations substantially increases the risk of building degradation, it is of importance to map factors that increase the chances that housing cooperatives may come to an agreement on carrying out sustainable and energy efficient renovations.

This research builds on a former project on barriers and drivers for ambitious renovation in housing cooperatives [3], a study by Hauge et al. [3] shows which factors may increase the chance that the residents/ owners in housing cooperatives agree on a sustainable energy efficient renovation. The results are based on 30 qualitative interviews of professional advisors in cooperative housing associations, and chairman/ board and residents in three chosen case studies. The findings show that success criteria and barriers are found within the societal level and the organizational/ individual level. Barriers and success criteria within the societal level are: knowledge level regarding energy efficient renovation among relevant actors, owner structure of housing, and existing regulations and incentives. For the organizational and individual level, the following categories influencing renovation processes were identified: time frame of the process, organization of the process, understanding residents' needs, economy, flow, and available exemplary projects and role models. In order to influence residents in housing cooperatives to agree to sustainable energy efficient renovation, the following aspects were found to be crucial for the housing cooperative board [4]:

- To be open about the plans, and at an early stage inform about necessary renovation and prepare for a good dialogue with the owners and residents.
- To invest plenty of time to let the project and let decisions mature.
- To seek advice. Involve the cooperative housing associations or equivalent advisors early in the process.
- To agree within the board on a joint proposal for renovation.
- To involve people who can create enthusiasm when the project is put to the owners and residents.
- To let the owners/ residents take the floor. Remember that the need for information among owners and residents is crucial. They must be able to ask questions, voice objections, and introduce new ideas.
- To take the owners' and residents' suggestions seriously. This is important in order to create confidence and anchor the project.
- To provide information in small portions, both orally and written. Use examples, pictures and a simple language.
- To set up the calculations showing the financial consequences for the individual owner. Show how the costs and energy savings affect monthly costs over time.
- To wait with the voting on the renovation until the shareholders are adequately informed. Then the project

is more likely to gain support.

The current research project has tested these findings and guidelines. *The aim of this paper is to describe some of the most relevant drivers and challenges for sustainable renovation more in depth, in addition to investigating the role of AMS for renovation.* The results are not just transferable to the housing cooperative model, but also to similar housing models internationally. They are also relevant in situations where the residents do not own their housing unit, but are involved in decision-making processes regarding renovation.

2. Method

Through action research, three case studies looking at decision processes for sustainable upgrading were followed over a period of two years. Action research is used as an approach in interviews, observations and counselling. The research is interdisciplinary. Technical advice during the renovation process has been important for the participants, in addition to research and counselling on the decision processes. To strengthen the connection between theoretical models and reality, action research has been described as a strong method [5]. Action research seek to generate solutions to actual problems in different contexts [6], but also to explain phenomena in inter-human interactions, in which the researchers play a part [7]. Action research is characterized by sympathetic and democratic processes. The method may contribute both to science and actual change [8].

Case studies represent a central approach in architectural research. One or more cases are studied from different angles in their natural setting [9, 10]. Case study methodology aims to explain a complex reality, in contrast to methods that concentrate only on a few variables. Case studies have to be seen in relation to reality and their unique characteristics [10]. These have to be described and cannot be left out in analyses of results. The results from the case studies/ interviews can be generalized through *analytical generalization*, meaning that the findings from one study can be used as a guide to what might occur in other, similar situations [11].

Table 1. Case studies

Case studies	Year of constr.	Size	Available area	Heating	Process/aim
Vigvoll terrasse, housing cooperative, Kristiansand	1976	224 apartments	3745 m ²	Electric	Low energy class I approved
Stjernehus, housing cooperative, Kristiansand	1965	60 apartments	3750 m ²	Electric + radiators	Low energy class I approved
Håkkagata, joint ownership, Steinkjer,	1962	6 private apartments and 3 commercial	808 m ²	Electric	Nothing decided



Fig. 1. (a) Vigvoll terrace housing cooperative; (b) Stjernehus housing cooperative, photo: Sørlandet Boligbyggelag; (c) Håkkagata housing cooperative, photo: Ivar Bliko

There have been conducted three workshops and two group interviews meetings with four to nine persons taking part; board members/ residents from three case studies, representatives from two housing cooperative associations, and representatives from two NGOs. All the interviews were semi-structured, and most of them were conducted in the presence of two or more researchers with technical and social science competence. In all case studies, the chairman or the professional advisor in the cooperative housing association arranged the interviews with the board/

residents. The interviews focused on evaluation of the renovation decision process, possibilities and obstacles to future renovation. All interviews were recorded, and the issues and views brought forward in the interviews were written down, grouped, analysed and discussed.

3. Results and discussion

3.1. *The decision process moves in circles*

Openness in the initial stages of the process is crucial. As Hauge et al.[3] found, it takes time to get support for a sustainable renovation, and a timeframe of 1-3 years was suggested based on interviews. The decision process has to mature over time. The case studies of the current research project emphasize this aspect. In all current case studies, the decision process has taken 4-5 years, or even more, dependent on how the starting point is defined. The housing cooperative Stjernehus in Kristiansand is also an example of how the decision process moves in circles. Interviews with employees in housing cooperative associations confirm this; they have seen many examples on decision processes moving in circles. When a sustainable renovation is put to the vote at a meeting, only residents that have paid attention turn up. A decision for renovation awakes residents who are afraid of rent increases, and they collect signatures to set stop the renovation plans. The board has to start over again to get support for a necessary renovation. However, at each round, more and more residents realize that something has to be done to improve the buildings. At last a sustainable renovation is decided. A positive side effect when an idea for renovation is voted down is the energy it creates among residents who have a positive attitude to the plans. It looks like this exhausting process is necessary to obtain results in some cases. This is what it takes to make the residents realize that something drastic has to be done to the building mass. Is it possible to avoid this drawn out process? If so, how? This connects to the next category of findings; how to engage the residents.

3.2. *How to engage the residents*

Based on interviews with residents/ board members and employees in housing cooperative associations, Hauge et al. [3] summed up different advices on how to engage the residents in the renovation plans. However, the current case studies show challenges with regard to getting the residents to show up at resident meetings at all. The renovation plans fail because the residents do not get information in the first place. The case study of Stjernehus has examples of how opponents of the renovation plans deliberately remove information, and that residents in general were quite indifferent to the renovation needs. The challenge was: very few people turned up at the resident meetings about renovation, and the residents that were most engaged were the opponents.

The case study of Vigvoll showed that the decision process loosened when professionals were hired to run the process. The housing cooperative association gave them an overall picture of what had to be done, and became a driving force for the process and the ambitions. The Håkkagata joint ownership case is small, and does not have a connection to any housing cooperative association (professional advisors). This, indeed, is the case for many joint ownerships (sameier) in Norway. They often lack support from experts, and contact with professionals is more casual and short termed. Joint ownerships often struggle with running the decision process for renovation alone.

At Stjernehus the board members had to visit everybody in the housing cooperative and talk to them personally, to get the resident support they needed for the plans. The importance of using a person that has the ability to create enthusiasm has been emphasized in some of the group interviews. At Stjernehus, they also managed to get representatives for the opponents onto the board, and this person then realized the necessity of the renovation.

In addition, different ways of visualizing renovation plans and seeing reasons for a more energy efficient building is investigated in this research project. At Vigvoll a "test flat" was renovated to show the residents the new look and the new technical solutions. The board/ residents and housing cooperative association saw the positive effects of this show room. It created dialogue with the residents who were more interested in the aesthetical factors (both interior and exterior) than the technical solutions as such. Having an available flat to create a show room in housing cooperatives is rare, but it demonstrates the importance of quality illustrations. 3D-illustrations and other options that may visualize the future building appearance are of course also useful.

All the case studies have examples of residents asking for more details regarding economy after the renovation.

There will never be enough information on economy, but it is challenging to weigh this need against the uncertainty of the calculations early in the process. The earlier the residents understand the future monthly rents, the better their chances of getting used to the costs and plans. The costs have to be compared to the costs of building degradation. It is important to communicate the financial benefits of a more energy efficient building. In the group interviews, more creative ways of financing the renovation were also discussed. There are examples of housing cooperatives building an extra floor or an extension, and selling the new flats to finance an ambitious renovation [12]. This is an option especially in the cities where the price per square meter is high.

3.3. Financial support schemes and contract models

The two case studies in Kristiansand also give examples of the problems with financial support schemes. In Norway, the governmental organization Enova gives financial support to ambitious renovation projects, obtaining the energy standards "low energy class 1 or 2", or "passive house". The economic support can be decisive to get the residents to agree to an ambitious project. The manner in which the financial support is decided, turns out to be rigorous and without the necessary contextual flexibility. The standards are made for new constructions, but are also used for renovations. It is therefore requested that the financial support is distributed discretionarily in order to carry out ambitious renovations in practice. The professionals who designed the renovation of Stjernehus and the technical advisors among the scientists in this project are of the opinion that the detailed factors which have to be obtained to get financial support are too strict and do not lead to the best renovation projects. This applies especially to the use of different sustainable energy sources. The financial support has also turned out to be more uncertain than it seemed, and the involved professionals ask for more predictable support schemes.

Stjernehus housing cooperative is through a parallel research project on EPC also evaluated for energy contracting [13]. Energy contracting means that the contractor or a third party is responsible for the necessary financing and guarantees, and the measures implemented will generate energy savings. The savings pay for the project costs through a specific contract period. At the end of the contract period, the customers are reimbursed for their actual savings. Common fees for the residents will not increase during the repayment period. The financial risk is transferred to the contractor. The contract period is determined by the measure and profitability related to the scope of the project. In Norway, EPC is currently used mostly by municipalities. For Stjernehus it was of great importance to keep the monthly costs low. An EPC provider assessed this case, and concluded that it is a problem that not all heating is centralized. It would therefore be too difficult to control energy consumption for heating in each apartment. The buildings are also in such poor condition that it will be difficult to find energy savings sufficient to finance all the work that should be done to the buildings [13].

3.4. Visualizing energy use / AMS

Also, visualizing the results and consequences of energy use may be effective means to obtain an understanding for energy efficiency and sustainable renovation. Visualization of AMS (Advanced Monitoring Systems) can make residents more aware of their energy use, and explain/illustrate the need for upgrading/ renovation. At Håkkagata, AMR-technology has been installed, and a Focus Group Interview (Workshop) was conducted in relation to the newly installed technology. The installation of the new technology has stirred up a discussion at Håkkagata, and the residents are clearly interested in exploring different energy saving measures for the building as a whole. However, the reasons for wanting to do something are somewhat disparate, and so are the different house owners' respective financial situations. The building structure is further complicated by previous implementation of different technological solutions for heating and ventilation. Installation of AMR-technology has, so far, contributed to giving the residents and shop owners a common platform for discussions, and consensus that something needs to be done. The installation of new technology also brought up a discussion about important aspects to be considered regarding a future choice of a common energy system. Issues like safety, comfort, aesthetics and health were brought up. The new technology has also, according to one informant, given rise to more awareness on energy use in the building as a whole, in addition to the energy use in the separate apartment in question. The resident in question has been switching off the radiator in the staircase when passing it. This particular informant has also recently installed glass doors on the balcony to protect from noise and pollution. The possibility of making a full renovation of the building frontage was also discussed, and the reasons for doing this were disparate. The AMR-technology has resulted in a change in the electricity billing for separate households in the building. Some have had a notable increase, while

others have had a decrease, and this is taken as a confirmation of the new metering system being more "correct" than the old. After renovation, the indoor climate may be more easily influenced by the building use. If the results of AMR-measurements are communicated in a successful way, AMS may help the residents to maintain an environmentally friendly life style over time. This will be tested in this particular case in the project.

4. Conclusions

Agreement on sustainable renovation in housing cooperatives is a challenge. The process takes years, and often goes in circles. The problem is to engage the enthusiasm of the residents, make them realize the degradation of the buildings, and the need for renovation and energy efficiency. The case studies show the positive effects of visiting all the residents, visualizing the renovation plans through a "test flat"/ show room or illustrations to create dialog and enthusiasm. The case studies also exemplify the need for more predictable support schemes for ambitious renovation, and the challenges of energy contracting in the housing cooperative sector. The early stage use of AMR in one of the case studies shows that this technology has contributed towards creating a serious discussion about the need for renovation and energy upgrading solutions for the building as a whole. It has also given rise to an increased awareness of energy use. An interesting part of the project will be to follow up these discussions and see whether the interest will result in actual ambitious measurements being taken. One challenge is *maintaining* the interest that has been raised as a result of the implementation of AMR-technology over time. An important part of the research project is exploring how the data measured by means of AMR-technology should be communicated (visualized) to the end users, in order for it to have a lasting effect on their energy use and on their decision making processes regarding ambitious upgrading.

Acknowledgements

Thanks to all board members/residents in the case studies, housing cooperation associations and other participants in the reference group. The research is financed by the Norwegian Research Council.

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